Short Answer:

Answer the following questions with complete sentences in your own words. You are encouraged to conduct your own research online or through other methods before answering the questions. If you research online, please consult multiple sources before you write down your answers. You are expected to be able to explain your answers in detail (Provide examples to each question).

1. Describe the Collections Type. Explain each Collection type in detail, especially pointing out the scenarios for using certain Collection type

2. What's the difference between Generic Collections and Non-Generic Collection?

3. What is IEnumerable? What is IList?

4. Explain the time complexity of List, LinkedList, and Dictionary on adding/removing/updating/deleting

5. What are the differences between Dictionary and SortedList?

6. What is the GetHashCode() and Equals() function?

7. How Is Dictionary Implemented in C#? How does its Implementation use GetHashCode and Equals Methods of Object?

8. What is IEquatable<T> Interface?

9. What is IComparable and IComparer interface? What are the differences between them and how to use them?

Coding Questions:

Write code in c# to solve the following problems. Please write your own answers. You are highly encouraged to present more than one way to answer the questions. Please follow best practices when you write the code so that it would be easily readable, maintainable, and efficient. Clearly state your assumptions if you have any. You may discuss with others on the questions, but please write your own code.

1. Write a C# program to iterate a List in reverse order.

2. Write a C# program to iterate a LinkedList in reverse order.

3. Write a C# program to get the first and last occurrence of the specified elements in a List

4. Write a C# program to get the first and last occurrence of the specified elements in a LinkedList

5. Write a C# program to compare two sets and retain elements that exist on both sets.

6. Given a string, find the first non-repeating character in it and return it's index. If it doesn't exist, return -1.

Input: s = "leetcode", return 0.

Input s = "loveleetcode", return 2.

7. Sort a List in descending order. (hint: customize comparer)

Eg. given [1,7,3,2,5,9,7], return [9, 7, 7, 5, 3, 2, 1]

8. A phrase is a palindrome if, after converting all uppercase letters into lowercase letters and removing all non-alphanumeric characters, it reads the same forward and backward. Alphanumeric characters include letters and numbers.
Given a string `s`, return `true` *if it is a palindrome, or* `false` *otherwise*.

Test case 1:

```
Input: s = "race a car"

Output: false
Explanation: "raceacar" is not a palindrome.
```

Test Case 2:

```
Input: s = "A man, a plan, a canal: Panama"

Output: true
Explanation: "amanaplanacanalpanama" is a palindrome.
```

9. A DNA string is made up of four symbols: A, T, C, and G. Eash symbol has a complement:1) A and T complement each other. 2) C and G complement each other

Determine the reverse complement of a DNA string by reversing the symbols in the string and replacing each symbol in the reversed string by its complement

Example.

Input string s = GTCAG

The method should first reverse the string: GTCAG -> GACTG

Then replace each symbol with its complement: GACTG -> CTGAC

Then return CTGAC

Write a c# program/method which takes a string as input, and returns the reverse complement of the given DNA string